BIENNIAL REPORT

1993 - 1995

St. Lawrence
Vision 2000

Leo-Guy de Repentigny, CMS

Gouvernement du Canada | Government of Canada

Québec

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MESSAGE FROM THE FEDERAL MINISTER OF THE ENVIRONMENT

As Canada's Minister of the Environment, it's a pleasure to be associated with this St. Lawrence Vision 2000 Biennial Report . Not only does it show positive environmental renewal in this ancient river gateway to the new world but underscores the importance of partnership and co-operation.

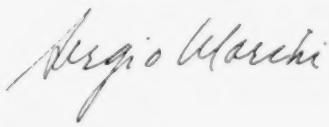
As you will see in the report, this far-reaching, multilateral project is well on its way to being a success, and we can be optimistic about achieving the objectives that were set. You will see that we have drawn up the inventory of 106 industrial plants, completed several clean-up projects, identified threatened marine habitats and protected more than 4000 hectares of new habitats. We have also ensured water quality monitoring of the St. Lawrence River and its tributaries.

Several projects to protect public health have also been undertaken, as well as pilot projects to stabilize the banks of the St. Lawrence. Thanks to the participation of ZIP committees (zones d'interventions prioritaires - areas of prime concern) and to the Community Interactions Program, we have triggered a new movement involving riverside communities. Only through the involvement of the public along the St. Lawrence, can we reach our objectives for the protection of the River and its designated tributaries.

Many of the gains made in improving our environment have come about because various levels of government made the issue a priority and worked together. Successful environmental partnerships must be encouraged in the same stream, the same river, the same gulf and in the same world.

If we are to find justice for our environment and hope for future generations, we must continue to work together to preserve the St. Lawrence ecosystem. After all is said, we must consider ourselves the protectors of the environmental heritage of the generations yet to come.

Just as the mighty St. Lawrence has always been a watery road to the future, this report must be viewed as a navigation chart for an ever brighter, clearer and healthier future. This report shows what has been done, what can be done and still what must be done.



Sergio Marchi

Minister of Environment Canada

Message from the Minister of the Ministère de l'Environnement et de la Faune du Québec

As the Québec Minister responsible for the St. Lawrence Vision 2000 agreement, it is my pleasure to present this 1993-1995 report to you.

The St. Lawrence River is the backbone of Québec's culture and development as a society, in addition to being a vital component of its natural and historical heritage. Over time, however, major environmental problems arose from the heavy concentration of populations on the shores of the St. Lawrence and its tributaries and attendant agricultural and industrial growth. In response to this, the government of Québec launched the Québec wastewater treatment program (PAEQ) in 1978 and entrusted the Ministère de l'Environnement with the task of managing it. In order to widen the scope of its actions to protect the St. Lawrence, and owing to the different jurisdictions involved, the government of Québec signed a cooperation and harmonization agreement with the government of Canada in 1989 to implement the St. Lawrence Action Plan. In 1994, a new plan known as St. Lawrence Vision 2000 was hammered out.

Under St. Lawrence Vision 2000, concerted efforts by the governments of Québec and Canada regarding the St. Lawrence are made possible. Among contributions so far, is the preparation of state-of-scientific-knowledge reports upon which riparian communities are to base response strategies for their respective regions. Moreover, in addition to the creation of ecological reserves to protect several priority habitats, the quality of waters from designated tributaries was monitored and 59 projects resulting in a significant reduction of toxic waste discharged into the St. Lawrence were funded. As evidenced by the report, we are well on our way to achieving our objectives in the coming years.

But the restoration and protection of our majestic river is incumbent upon us all; it is therefore crucial to establish strategic links and get people involved. In that spirit, St. Lawrence Vision 2000 established a dynamic partnership with environmental groups, wildlife-oriented associations, companies, municipalities and all citizens with skills and knowledge to contribute.

I invite all Québeckers to take up the challenge of reclaiming the St. Lawrence and its designated tributaries. The St. Lawrence is our crown jewel. If we are to give it back its health and beauty, we must face together the many challenges that lie ahead.

David Cliche

Ministre de l'Environnement et de la Faune du Québec

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A WORD FROM THE CO-PRESIDENTS OF THE AGREEMENT

St. Lawrence
Vision 2000

The St. Lawrence Action Plan (SLAP) came to an end on March 31, 1993. The purpose of this plan, the first major harmonization agreement on environmental action between the federal and Quebec governments, was to construct a coherent framework for government initiatives related to the St. Lawrence River.

Encouraged by five years of solid achievement under the St. Lawrence Action Plan, the federal and Quebec governments agreed to renew the harmonization agreement and thus continue their concerted action.

In April 1994, after a year-long process to re-assess activities carried out under the initial agreement, reconcile their respective expectations and set new joint objectives, the two governments ratified a new action plan, St. Lawrence Vision 2000 (SLV 2000). This agreement terminates in March 1998.

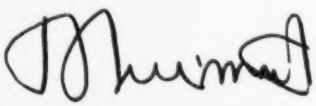
The two governments are particularly proud of this new action plan. Its purpose is to conserve and protect the St. Lawrence ecosystem, in order to reclaim the River for the public in a context of sustainable development.

Although SLV 2000 continues the work begun under SLAP to reduce industrial discharges into the St. Lawrence, it places increased emphasis on pollution prevention and conservation of the St. Lawrence ecosystem.

With a more comprehensive approach to environmental management, SLV 2000 encourages governments, community organizations and numerous other partners to coordinate all activities affecting the St. Lawrence.

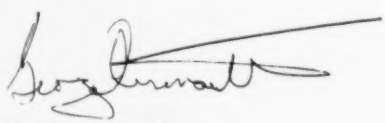
This biennial report (1993-1995) presents accomplishments and progress achieved since April 1993. Therefore, it covers results obtained in the final year of the St. Lawrence Action Plan and those reached in the first year of SLV 2000.

Interested groups and the general public alike are encouraged to demonstrate their support for the objectives of SLV 2000, which can only succeed through a clear expression of the common will. SLV 2000 sets an example of co-operative action that respects the objectives of sustainable development, to which the federal and Quebec governments strongly subscribe.



François Guimont

Director general
Quebec Region
Environment Canada



George Arsenault

Assistant Deputy Minister
Direction générale de la ressource faunique et des parcs
Ministère de l'Environnement et de la Faune du Québec

A RENEWED ACTION STRATEGY FOR CONSERVING AND PROTECTING THE ST. LAWRENCE AND ITS ECOSYSTEM

St. Lawrence Vision 2000 (SLV 2000) does more than just carry on the St. Lawrence Action Plan (SLAP). By seeking not only to protect the river environment but also to conserve the St. Lawrence ecosystem, it addresses new concerns and breaks new ground.

SLV 2000 includes seven major components, each designed to have a lasting impact on the St. Lawrence and its environment. Five of these components centre on ecosystem conservation and pollution prevention.

Reducing toxic effluent discharged into the St. Lawrence by polluting plants remains an important objective of SLV 2000. In addition to the 50 industrial plants targeted under SLAP, 56 other plants along the St. Lawrence and its tributaries are receiving attention. Another major objective (which is also shared with the Great Lakes 2000 plan) is to virtually eliminate discharges of persistent bioaccumulative toxic substances.

SLV 2000 continues efforts begun under the other components of SLAP as well. The Conservation (now Biodiversity) component is designed to conserve habitats and promote the recovery of threatened or declining species, particularly the St. Lawrence beluga. The Restoration component is directed at restoring deteriorated sites along the St. Lawrence. Finally, scientific and research activities are being carried out under the Decision support component.

AN "ECOSYSTEM" VISION

Federal and provincial departments participating in SLV 2000 have adopted a comprehensive, integrated, "ecosystem" approach to tackling the problems of the St. Lawrence. One aspect on which SLV 2000 will focus between now and 1998 is non-point source pollution, particularly that coming from the tributaries. To accomplish this, action will be mainly concentrated on the following seven tributaries :

L'Assomption

Boyer

Chaudière

Richelieu

Saguenay

Saint-Maurice

Yamaska

NEW AREAS OF ACTION

While building on the achievements of SLAP, SLV 2000 takes action on such new fronts as agricultural clean-up, health protection in communities along the St. Lawrence, and community involvement.

GREATER COMMUNITY INVOLVEMENT

The general public has a key role to play in implementing this new plan. Local advisory committees will be established for each area of prime concern (ZIP). In addition, public consultations will be held for purposes of preparing Ecological Remedial Action Plans for priority areas. SLV 2000 also offers technical and financial assistance to organizations wishing to conduct local projects to protect and restore the river environment.

GREATER CO-OPERATION

The federal and Quebec governments have agreed to coordinate and harmonize their activities to clean up and protect the St. Lawrence River. A larger number of government agencies are involved in implementing SLV 2000, including the federal departments of Environment Canada, Fisheries and Oceans, Health Canada, Agriculture and Agri-Food Canada, Canadian Heritage

and the Federal Office of Regional Development-Quebec, and the ministère de l'Environnement et de la Faune du Québec, the ministère de la Santé et des Services sociaux du Québec, the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec, and the ministère des Affaires municipales.

ACTIVE PARTNERSHIP

To better achieve its objectives, SLV 2000 will encourage active co-operation and participation with partners from the private sector, the academic community, environmental groups, research centres and other local organizations. In addition, an advisory committee will be established as a forum for discussing community concerns.

BIODIVERSITY

Pierre Lapointe, CWS

PRESERVING BIOLOGICAL DIVERSITY

ISSUES

Since the middle of this century, the environment of the St. Lawrence River has been subject to economic and social development which is completely at odds with current principles of sustainable development. Territories of great ecological value have been destroyed, endangering the species that inhabit them. One of the main characteristics of a healthy ecosystem is the variety of plant and animal species it contains. Biodiversity, a basic ecological concept, can be defined as the variety of living organisms in a given location. The concept refers not only to the diversity of genes, species and ecosystems present in a particular region, but also to the range of ecological processes with which they interact.

TARGETED RESULTS

Protect 7,000 hectares of habitat

Help maintain or restore 12 species that are threatened or in decline

Carry on the recovery plan for the St. Lawrence beluga

Restore the smelt population in the Boyer River

Increase the productivity of five disturbed marine habitats

Establish a network to monitor the condition of the River

Publish a report on St. Lawrence biodiversity

Establish a plan to protect, restore and enhance coastal areas

Given the immense importance of biodiversity, the stakeholders of St. Lawrence Vision 2000 (SLV 2000) were fully justified in devoting an entire component to it. Maintaining biodiversity requires above all knowledge of biological diversity, but also a solid understanding of the impact of human activity on the range of life-forms involved. In addition, concrete measures must be taken to preserve habitats and promote the recovery of threatened species. These indissociable principles underlie the concerns and actions of the Biodiversity component.

In general, Biodiversity initiatives are aimed at acquiring basic data on biodiversity and protecting critical habitats for plants and animals. Efforts are also directed at promoting the maintenance or recovery of threatened species. Depending on the situation, these measures may be preventive or corrective. Nevertheless, they are always intended to create conditions that will ensure the survival of the St. Lawrence ecosystem.

PARTNERS

Three government departments are working together to introduce measures to preserve biodiversity. They often co-operate very closely with local non-governmental agencies.

The ministère de l'Environnement et de la Faune du Québec is responsible for projects dealing with rare plants, threatened fish, amphibian and reptile species and certain species of birds. It also helps protect priority habitats by creating ecological reserves.

The federal Department of Fisheries and Oceans is seeking to enhance the productivity of degraded marine

habitats, and to develop tools that will better protect coastal zones. As well, it is involved in a project to promote the recovery of the St. Lawrence beluga population. An independant team of specialists has been set up for this purpose, with representatives from the departments participating in SLV 2000 and various other bodies. These include the Department of Canadian Heritage, the ministère de l'Environnement et de la Faune du Québec, the World Wildlife Fund (WWF), the Groupe de recherche et d'éducation sur le milieu marin (GREMM), the Institut national d'écotoxicologie du Saint-Laurent (INESL), the World Conservation Union (IUCN), and Guelph University.

Environment Canada is preparing a report on the biodiversity of the St. Lawrence. Its efforts also include protecting several threatened bird species, creating or consolidating national wildlife areas, and preserving plant and animal habitats by various means such as land acquisition and private stewardship arrangements.

ACTIVITIES

The SLV 2000 stakeholders have set specific objectives that largely shape the activities of the Biodiversity component. In general, these efforts are directed at ensuring the survival and development of the widest possible range of species and suitable habitats. The areas targeted for action encompass both wetlands and terrestrial habitats, as well as freshwater and saltwater environments. The Biodiversity component has a goal of preserving 7,000 hectares of habitats, and enhancing and restoring five marine habitats that are critical for several species of fish, which use them as spawning and nursery grounds, or as their home range. The measures implemented under SLV 2000 will help boost the productivity of these zones.

In addition to preserving habitats, the partners of the Biodiversity component are seeking to ensure the survival of a number of plant and animal species, such as the rainbow smelt, whose population has declined considerably in recent years. Efforts have been devoted to restoring the Boyer River spawning ground, which used to be the largest rainbow smelt spawning area on the south shore of the St. Lawrence. This multifaceted project is targeted at the entire Boyer River drainage basin, which covers 217 km^2 and includes two municipalities and 300 farms. Between 1993 and 1995, the Biodiversity team set up an operating structure to enlist farmers' volunteer participation in this initiative. Steps have been taken to improve water quality by reducing organic inputs and sedimentation caused by soil erosion.

Another goal which has mobilized the SLV 2000 partners is that of ensuring the survival of the St. Lawrence beluga population, which was also an objective of the St. Lawrence Action Plan (SLAP). Stakeholders of the Biodiversity component have assumed certain responsibilities relating to the Saguenay–St. Lawrence Marine Park, for example, by supporting research to gather more information on this region—an initiative that should improve park management and afford better protection to local species.

In addition to focussing attention on the rainbow smelt and the St. Lawrence beluga, the SLV 2000 team has drawn up a list of 155 priority species, using flora and fauna assessments prepared under SLAP. The list comprises 110 plant, 19 bird, 14 fish, 6 reptile, 5 mammal and one amphibian species, all of which have a declining population and are directly dependent on the St. Lawrence River for their survival.

Some of the species on this priority list will be accorded special attention as well. Following a preliminary documentation and data gathering stage, a recovery plan will be prepared for species designated as threatened. For species considered to be at less at risk, a series of measures will be devised with a view to maintaining their population levels.

In parallel with this, the Biodiversity component stakeholders are supervising three other major projects. One of these involves the Centre de données sur le patrimoine naturel du Québec, an organization founded in 1988 to collect and process data on Quebec's flora and fauna.

This information, which is available to the public, can be used for conducting scientific research, identifying sites in need of protection, and carrying out impact studies. The Centre is part of a North American network that studies the distribution of species over a territory extending far beyond the borders of Quebec.

The second project consists in developing an information system that will facilitate the preparation of a plan for conserving, restoring and enhancing coastal areas. The new Spatial Analysis System (SAS) will provide data on resources, habitats and potential environmental threats throughout Quebec's marine regions.

Lastly, the various Biodiversity partners have begun working on a comprehensive report on the biodiversity of the St. Lawrence River. This report has two objectives: to present a portrait of the river's biodiversity, and to guide future action to preserve, protect and manage its various components.

RESULTS

Protection of habitats

The habitat protection measures for the 1993-1995 period have produced excellent results: 4,683 hectares, or nearly 65 percent of the overall target of 7,000 hectares set under the agreement, now have proper protection.

From 1993 to 1995, the Biodiversity component team identified five degraded marine habitats that need to be restored or enhanced, namely, the Grand-Pabos barachois in Chandler, the Malbaie barachois south of Gaspé, the Bonaventure barachois, the Havre aux Basques lagoon in the Magdalen Islands, and the Pointe-aux-Outardes marsh near Baie-Comeau.

Rehabilitation work began in the Bonaventure barachois in 1995. The projects to restore the Malbaie and Grand-Pabos barachois and the Pointe-aux-Outardes marsh are now at the documentation and data gathering stage. Recent studies, analysis and discussions on the Havre aux Basques lagoon will help point the way for restoring this habitat as well.

Briefing documents on the Bonaventure and Grand-Pabos barachois enhancement projects were published during the year.

Rainbow smelt

Work aimed at rebuilding the rainbow smelt population in the Boyer River progressed rapidly between 1993 and 1995. In 1995, 28 farm resource management and development plans covering 2,116 hectares were established with a view to environmental protection. Efforts have also been devoted to training farmers and improving fertilizer and slurry spreading equipment. As well, in order to reduce soil erosion along the Boyer River, farmers from 82 agricultural enterprises installed water troughs to keep their livestock from damaging the riverbanks. As a result, strips of vegetation have been planted to begin stabilizing the shoreline. In addition to the partners mentioned

LIST OF PROTECTED SITES AND CORRESPONDING AREA

SITE	AREA PROTECTED (ha)
Île au Cochon	39.50
Île Saint-Jean	0.68
Baie Lavallière	15.04
Île de Grace	45.50
Île Lapierre	47.90
Millette and Stranham islands	13.70
Saint-Jean Stream	27.26
L'Isle Verte	19.55
Heath Point	1,071.00
Grand-Lac-Salé	2,350.00
Grands-Ormes	705.00
Île Avelle	63.00
Île Soyez	13.50
Pointe de l'Est	248.52
Baie de Saint-Augustin	23.00
TOTAL	4,683.15

earlier, the Municipalité régionale de comté de Bellechasse, the Union des producteurs agricoles and the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec played a key role in enlisting the co-operation of local residents.

To accelerate the return of rainbow smelt to the Boyer River once restoration work is complete, researchers developed egg incubation techniques in the Église Stream in Beaumont. Working in conjunction with the Centre écologique du Lac-Saint-Jean, they obtained a survival rate of 90 percent.

The St. Lawrence beluga

In furtherance of the action plan to ensure the survival of the St. Lawrence beluga population, a multidisciplinary team of specialists was commissioned to draft a recovery plan for this marine mammal. This plan, which is modelled on recovery plans for terrestrial species, is the first of its kind to be implemented in Canada for a marine species. The St. Lawrence beluga is also being studied under the Decision Support component of SLV 2000.

Threatened species

Recovery plans will also be prepared for a number of species that inhabit the St. Lawrence corridor. To date, six bird species have been covered: the Peregrine Falcon, the Piping Plover, the Horned Grebe, the Roseate Tern, the Loggerhead Shrike and the Yellow Rail. A recovery plan will also be drawn up for a fish species — the copper redhorse.

Peregrine Falcon

The Peregrine Falcon recovery plan, launched some fifteen years ago, is now considered a resounding success. Surveys conducted between 1993 and 1995 show that the species' population has returned to early 20th century levels, with 10 breeding pairs now established in the St. Lawrence Valley. The population's vitality is ensured by an average birth rate of 15 young per year.

Piping Plover

The Piping Plover has been a special focus of recovery efforts since SLAP was first implemented. Since this species nests on the beaches of the Magdalen Islands, it is vulnerable to disturbance and accidental destruction of broods, particularly by all-terrain vehicles. From 1993 to 1995, efforts were devoted to heightening public awareness of the species' situation, and to installing fencing around nesting sites. This public education campaign has borne fruit: in 1994, there were 50 Piping Plover pairs in the Magdalen Islands, compared with only 35 in 1988.

Horned Grebe

Surveys conducted in the Magdalen Islands in 1994 revealed that Horned Grebes had abandoned half of the nesting sites they had occupied the previous year. At present, specialists do not know whether this phenomenon reflects a decline in the population or simply an annual variation. Nonetheless, given the small size of the population, the situation is worrisome. A status report on the Horned Grebe was prepared for provincial legislation purposes. This species will eventually be classified as either threatened or vulnerable.

Roseate Tern

There is a very small population of Roseate Terns on the Magdalen Islands. In accordance with the recovery plan for this species, nesting boxes have been installed in order to promote breeding. Electric fencing has been installed around the colony as well, to protect it from predation by foxes.

Loggerhead Shrike

The Loggerhead Shrike population has been monitored since 1987. This species, which was abundant in the early 20th century, has practically disappeared altogether from the St. Lawrence Plain. Last year, not even one breeding pair was sighted. A team is visiting all nesting sites used in the past five years in an effort to determine whether the species is present and reproducing. A status report

on the Loggerhead Shrike has been prepared for provincial legislation purposes, and the species will eventually be classified as threatened or vulnerable.

Yellow Rail

In general, the Yellow Rail is not well known, mainly because of its timid nature, which makes observation difficult. During the summer of 1994, a sampling team spotted a few individuals along the St. Lawrence River, notably in the Gros Cacouna marshes and between Île aux Grues and Île aux Oies, where some 30 birds were counted. Banding has shown that the Yellow Rail may travel up to a few hundred kilometres at the height of the breeding season. Compilation of the results will shed a little more light on this species' status in the St. Lawrence corridor.

Plants

Measures implemented under SLV 2000 with respect to plants are aimed more at protecting non-degraded habitats than at restoring sites or reintroducing species.

During 1994-1995, studies to determine the extent of the decline were conducted on some 22 priority plant species selected from a list of species likely to be designated as threatened or vulnerable. Research focused on areas such as the Magdalen Islands, the Malbaie River and Bonaventure barachois, the banks of the St. Lawrence River near Saint-Vallier, the Mille Îles River and the Blanc Sablon region. Status reports were completed on some of these plants, including two — the water-willow *(Justicia americana)* and the green dragon *(Arisaema dracontium)* — that are among the southern species given priority under SLV 2000. In addition, the Griscom arnica was designated a threatened species by the Quebec government under the Règlement sur les espèces menacées.

Copper Redhorse

The copper redhorse is a fish species unique to Quebec. Research has been conducted on the species in recent years to determine why its population has declined in the Richelieu River, one of its rare habitats. Investigators are exploring two hypotheses that might explain this phenomenon: the degradation and loss of available habitats, and the presence of chemical contaminants in the water. Efforts have also been devoted to developing captive breeding methods so that some copper redhorse specimens can be kept on fish farms where they will be protected.

OUTLOOK

Several projects launched under the Biodiversity component between 1993 and 1995 should bear fruit in the coming months. For example, the St. Lawrence beluga recovery team is scheduled to present its plan in 1996. A similar project aimed at promoting the recovery of the spiny softshell turtle will also be completed this year. In addition, a botanical survey of the Mont-Saint-Pierre region, and of all the marshes of the freshwater estuary carried out in 1995, will provide information on a large number of endemic species and species with disjointed populations that occur in those areas.

BIRDS AND PLANTS : THE PUBLIC LENDING A HELPING HAND

An ornithological data bank has been set up by SLV 2000 in conjunction with bird-watching clubs in Quebec. Under the agreement signed between SLV 2000 and the Association québécoise des groupes d'ornithologues, over 350 nesting sites of threatened bird species have been monitored for more than two years. The goal is to ensure that each site is visited by amateur bird watchers at least once every five years. Specific observation criteria have been established for each species. This co-operative approach has yielded more comprehensive information on threatened species, which will be integrated with data collected by the Centre de données sur le patrimoine naturel du Québec. In 1994, amateur and professional botanists were invited to participate in a one-day botany survey at Mille Îles River. The information gathered on that occasion helped to round out existing survey data.

QUEBEC TURTLES': THE GOOD NEWS AND THE BAD NEWS

Quebec's turtles are very timid creatures and are not very well known. In fact, relatively little observation data are available on these reptiles. SLV 2000 conducted a survey in 1994 to determine the status of certain turtle species considered rare in Quebec. Researchers carefully studied an area bounded by the Ontario-Quebec border, Lake Saint-Pierre, Lake des Deux Montagnes and Lake Champlain. The survey revealed that the map turtle is more abundant in this region than previously thought. It also indicated that the spiny softshell turtle, spotted only in Missisquoi Bay, may have deserted its habitats in the Ottawa River and the islands around Montreal. Status reports on the map turtle and the spiny softshell turtle will be prepared next year. If these reptiles are designated as threatened species, a recovery plan will be prepared to protect their habitats and ensure their survival.

From 1993 to 1995, research continued on the fish species targeted by SLAP, notably, the striped bass, the lake sturgeon and the American eel. Over the coming year, the stakeholders of the Biodiversity component will have to make a decision on the future of striped bass. The lake sturgeon's situation has already been assessed from the standpoint of commercial fishing. Research on the American eel will continue in order to obtain abundance indices for use in estimating the species' annual recruitment. In addition, the SLV 2000 team will take stock of the recovery work done in previous years.

Work aimed at preparing a report on the biodiversity of the St. Lawrence River is going well. Over the past year, the project co-ordinators drew up a detailed table of contents. This report will discuss the concept of biodiversity and present a territorial framework for the St. Lawrence River corridor, divided into 23 zones according to specific physicochemical, topographical and geomorphological characteristics. The report will describe the variety of living organisms in each zone and list the critical ecosystem components that help to maintain biodiversity. In addition, the Quebec government's biodiversity action plan will be discussed in relation to the federal government strategy and the global context. The last part of the report will examine future avenues of research and issues related to the biodiversity of the St. Lawrence. The report is slated to be published in 1998.

Since 1993, the partners involved in the Biodiversity component have been working on developing a spatial analysis system (SAS). This system, which is based on spatiotemporal data processing, is a very useful management tool for preparing conservation and development plans for shoreline habitats along the St. Lawrence River. It will provide data on resources, habitats and potential environmental threats for all of Quebec's marine regions. The data will be presented in tables and maps produced using SPANS software. By means of modelling adapted to individual regions, sensitivity indices will also be developed, to delineate zones that have high potential and those that are more fragile. In 1993-1995, the Biodiversity team compiled information on Chaleur Bay, the middle estuary and the Magdalen Islands.

AGRICULTURAL CLEAN-UP

Léo Gay de Repentigny, CWS

ZEROING IN ON NON-POINT SOURCE POLLUTION

ISSUES

Pollution from heavily farmed drainage basins undermines the quality of the St. Lawrence ecosystem. This type of pollution is generally caused by improper use of fertilizers and pesticides, inappropriate storage of manure, and intensive farming practices such as monoculture, which promotes soil erosion.

There are two types of agricultural pollution: point source pollution and non-point source pollution. The former is similar to urban and industrial pollution and comes from specific, visible and identifiable sources, such as improperly stored slurry or liquid manure seeping into waterways.

TARGETED RESULTS

Four drainage basins concerned: L'Assomption, Boyer, Chaudière and Yamaska

Publish a layman's brochure on the agroenvironmental issue and possible solutions.

Publish an agroenvironmental diagnosis on each drainage basin including contamination sources water quality state and preferred measures.

Produce a report on the presence of pesticides in drainage basins' waterways.

Produce a report on the use of pesticides and fertilizers, and on agricultural practices.

Support four pilot projects initiated by the local community and assess their applicability to the entire basin.

Publish an agricultural clean-up plan for each of the four basins.

Non-point source agricultural pollutants are carried to waterways by surface and groundwater runoff and soil erosion. Taken individually, such pollutants may seem of minor importance; however, their combined impact on the environment is substantial.

Water quality problems caused by non-point sources of agricultural pollution are related to processes that are hard to evaluate. As pollutants travel from fields to streams and rivers, they are affected by various physical, chemical and biological processes, which modify their form and quantity and even temporarily slow their transfer to waterways. So many different transport and degradation mechanisms are involved that identical pollutants can have effects which differ in time and space.

To find lasting solutions to this problem, the Agricultural Clean-up component stakeholders of St. Lawrence Vision 2000 (SLV 2000) have to target agricultural sources of pollution, and even more importantly, strive to raise farmers' awareness of issues so as to adjust their farming techniques.

For the duration of SLV 2000, the initiatives of this component will focus on four drainage basins, namely, those of the L'Assomption, Boyer, Chaudière and Yamaska rivers. The goal is to make the key players more aware of environmental problems related to agriculture, and to propose possible solutions. The Agricultural Clean-up team also intends to propose an action plan to reduce agricultural pollution in the four drainage basins.

PARTNERS

The ministère de l'Environnement et de la Faune du Québec is responsible for technical co-ordination of all activities, in conjunction with the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec, Agriculture and Agri-food Canada and Environment Canada.

ACTIVITIES

The initial objective of reducing pesticide levels in the four tributaries by 50 percent by 1998 has proven to be overly ambitious. The parties responsible for the Agricultural Clean-up component have had to adopt a more realistic approach given the present knowledge base, the need to harmonize all programs related to farmland, the limited resources available and target groups' level of awareness.

Due to the nature and complexity of non-point source agricultural pollution, the Agricultural Clean-up team also realized that it would be difficult, over the short term, to implement concrete measures covering all farms in the targeted river basins. Before deciding on a course of action, the Agricultural Clean-up team has decided to evaluate the nature, causes and location of the various problems in the four drainage basins and, at the same time, to provide support for local, small-scale initiatives.

Environmental assessments are therefore being prepared for each river basin to highlight the link between sources of pollution, water quality, the state of the physical environment and solutions applied in recent years. These assessments should also help to devise solutions to existing problems.

A number of small-scale projects are also being carried out under the Agricultural Clean-up component. Technical support, follow-up and environmental assessments will be provided for:

- projects undertaken by various stakeholders on the Boyer River; and
- the two "drainage basin" projects launched under the Green Plan for the Chaudière and L'Assomption river drainage basins.

With regard to the Yamaska River basin, plans have been made to launch a project similar to the initiatives centering on the Chaudière and L'Assomption river basins. The Yamaska project, however, will concentrate on reducing pesticides.

Very little information is currently available on the presence of pesticides in the four rivers targeted by the Agricultural Clean-up component. Furthermore, little is known about fertilizer and plant protectant use by farmers in these regions. Therefore, a water quality follow-up project focusing specifically on pesticides will be carried out between now and 1998. As well, the Bureau de la statistique du Québec will conduct a study on the use of fertilizers and plant protectants.

RESULTS

In 1994-1995, the Agricultural Clean-up team met with various government partners to inform them of the component's goals and activities.

They also made a special effort to sensitize various stakeholders to the issues involved, which is a prerequisite to securing the commitment of key players. For this purpose, they prepared a preliminary briefing document on agroenvironmental issues. It describes various farming operations and their relationship to water quality, and

FARMERS TAKING THE ENVIRONMENT TO HEART

The Saint-Esprit Stream project highlights the willingness of a growing number of agricultural producers to improve farming techniques. The drainage basin of this stream is part of the L'Assomption River drainage basin and covers 2,200 hectares.

The Saint-Esprit Stream project committee, made up of local farmers, is in charge of this project launched in 1993. Thirty-five of the area's 55 farmers, who own 90 percent of the land, actively participate in the project on a volunteer basis. An agroenvironmental advisor provides support for their efforts. The agricultural engineering and agricultural economics departments of McGill University are also involved in the project, which is funded by the Canada-Quebec Subsidiary Agreement on Environmental Sustainability in Agriculture, initiated under Canada's Green Plan.

The Saint-Esprit Stream project is seeking to improve water quality in the Saint-Esprit drainage basin by reducing chemical inputs and by helping farmers to more effectively manage the organic composition of their soil. To achieve this goal, the committee is hoping that by recommending, rather than imposing, new farming techniques, they will help educate farmers and bring about a change in the attitudes of all parties concerned.

During winter 1995, farm producers were given courses in subjects such as soil analysis, the importance of organic matter and integrated fertilization. These courses involve concrete projects that enable participants to experiment with new techniques on a small scale. This approach is designed to make farmers aware of the advantages of adopting more environmentally friendly practices.

Obviously, it is too early to assess the environmental impact of these initiatives. However, certain changes are already noticeable. For example, more farmers are starting to use "green manure", that is, crops planted at the end of the summer to create permanent vegetation cover and boost the organic content of soil. There has also been a decrease of about 15 percent in the use of commercial chemical fertilizers. Moreover, some farmers are now applying fertilizer in strips rather than spraying it over entire fields. Most farmers have also adjusted their manure spreaders to use a more suitable amount of fertilizer.

gives a brief summary of more environmentally friendly practices. This document is intended for all stakeholders, including farmers, who will be called upon to help reduce agricultural pollution.

Members of the Agricultural Clean-up team took part in the 6th Semaine québécoise sur la conservation des ressources, centering on the theme "Integrated fertilization: taking farms' internal and external fertilization resources into account". They also participated in the Semaine de l'agriculture, de l'alimentation et de la consommation organized by the Université Laval in 1995.

In order to effectively monitor water quality, the Agricultural Clean-up component purchased two automatic sampling stations. These will be used to collect water samples and to monitor pilot projects in the targeted rivers. Sampling techniques adapted to non-point source pollution will take into account climatic events that have an impact on inputs to waterways and non-point source agricultural pollutants.

Last year, the team began to integrate data that will be used in preparing environmental assessments on nitrogen, phosphorus, suspended matter and pesticides in selected drainage basins.

OUTLOOK

As mentioned above, the activities of the Agricultural Clean-up component have so far focused mainly on heightening awareness, gathering data, providing support and monitoring pilot projects in targeted drainage basins. By the expiry of the agreement in 1998, an action plan will be prepared for extending the agricultural clean-up measures to encompass the entire drainage basin of all four rivers.

Ongoing improvement of water quality requires collective awareness and a common desire among stakeholders to change the way they do things. All players in the agricultural sector must make this commitment if lasting changes are to be made.

COMMUNITY INVOLVEMENT

Pierre Boisvert

BRINGING THE PUBLIC ON SIDE

ISSUES

A program such as St. Lawrence Vision 2000 (SLV 2000) can only achieve positive, tangible long-term results if people realize the importance of the St. Lawrence in their everyday lives and participate actively in efforts to restore it. It's a matter of environmental citizenship. Since riparian communities are intimately acquainted with the River, which is an everyday part of their lives, they have seen it change over the years. Consequently, their co-operation in conservation and development projects is essential.

The Community Involvement component of SLV 2000 is designed to motivate, encourage and support the participation of local residents in projects they consider important for their region.

The ZIP (areas of prime concern) and Community Interaction programs of SLV 2000 provide financial and technical support for community projects by local citizens. Bringing the public on side is a pivotal objective of SLV 2000!

TARGETED RESULTS

Prepare 11 reports covering 18 Zones of Primary Intervention (ZIPs) to support participation in developing and implementing Ecological Remedial Action Plans

Provide funding and other support for 140 community projects

Prepare one report covering two ZIPs along the Saguenay River

PARTNERS

Environment Canada and Fisheries and Oceans manage the Community Interaction program in co-operation with the ministère de l'Environnement et de la Faune du Québec, which sits on the project evaluation committee. The ZIP program receives support from Environment Canada, Fisheries and Oceans, Health Canada, the ministère de l'Environnement et de la Faune du Québec, and the ministère de la Santé et des Services sociaux du Québec; these agencies provide financial and technical support to the Stratégies Saint-Laurent organization and ZIP committees. Under an agreement with the two governments, Stratégies Saint-Laurent is responsible for co-ordinating and promoting the ZIP program in communities along the St. Lawrence.

ACTIVITIES

The ZIP (areas of prime concern) program

The two governments and their partners are taking an increasingly co-operative approach to implementing major projects. Such sharing of expertise ensures that common objectives will be successfully achieved.

In keeping with this co-operative thrust, SLV 2000 commissioned Stratégies Saint-Laurent, a non-governmental organization, to co-ordinate and promote the ZIP program. This organization is responsible for establishing ZIP committees and providing all services, thus ensuring a coherent framework for the program. ZIP committees are groups of stakeholders with common interests who

meet to solve issues relevant to specific sectors of the St. Lawrence.

The ZIP program includes three major stages. The first stage is the preparation of a report on the area of prime concern. These reports, which are to be drafted by federal and provincial government specialists and serve as basis for subsequent program stages, summarize available biological, physical, chemical, socio-economic and human health data for the thirteen study areas comprising the St. Lawrence–Saguenay system.

The second stage includes a public consultation organized by individual ZIP committees. The consultation takes the form of conferences at which all local residents can discuss the contents of the summary report and identify priorities for action in their respective areas.

In the last stage, individual ZIP committees develop Ecological Remedial Action Plans (ERAPs) in co-operation with community stakeholders. ERAPs define measures consistent with the priorities established in the consultation process that citizens wish to implement.

All governmental partners co-operate in the preparation of ERAPs by having their teams provide expertise for evaluating options, making decisions and setting technical goals.

LIST OF ZIP COMMITTEES AS OF MARCH 31, 1995

Baie-Comeau ZIP Committee
Haut-Saint-Laurent ZIP Committee
Est de Montréal ZIP Committee
Ville-Marie ZIP Committee
Alma-Jonquière ZIP Committee
Saguenay ZIP Committee
Baie des Chaleurs ZIP Committee
Québec et Chaudière-Appalaches ZIP Committee
Lac Saint-Pierre ZIP Committee

THE 13 STUDY AREAS WITHIN THE ZIP PROGRAMS

Lake Saint-François (report published);
Lake Saint-Louis (report published);
Lake Saint-Pierre (report published under the St. Lawrence Action Plan);
Valleyfield-Beauharnois segment;
La Prairie Basin (Lachine Rapids, Large and Small La Prairie Basins);
Montreal-Longueuil segment;
Varennes-Contrecoeur segment;
Trois-Rivières–Bécancour segment;
Québec City-Lévis segment;
Middle estuary;
Lower estuary;
Gulf of St. Lawrence and Chaleur Bay;
Saguenay River.

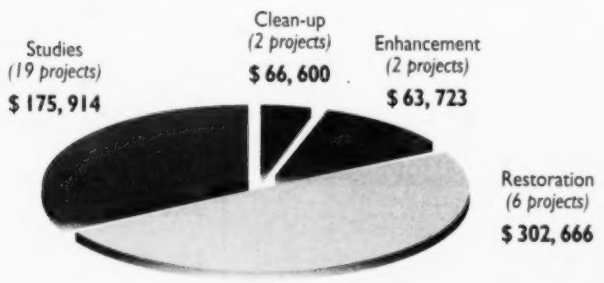
Community Interaction Program

The SLV 2000 Community Interaction Program was established to encourage public participation in developing and implementing projects to conserve, restore and enhance the St. Lawrence and seven priority tributaries.

The program provides financial and technical assistance for projects likely to genuinely improve the St. Lawrence ecosystem and its tributaries. Since government funding covers up to 70 percent of the cost of a project, proponents must find partners in the community who can provide additional support in the form of funding, services or equipment.

Applications are first reviewed by individual government departments. An evaluation committee then issues recommendations regarding final project approval. This committee consists of eight people: two representatives each from the federal and Quebec governments and four from the regions and from non-government organizations (Ducks Unlimited Canada, Attention Frag'Îles, the Société

COMMUNITY INTERACTION PROGRAM
Categories, number of projects et amount of grant



d'histoire naturelle de la vallée du St-Laurent, and the Corporation d'amélioration et de protection de l'environnement de Baie-Comeau).

RESULTS

In December 1994, the Community Involvement component signed a second agreement with the Stratégies Saint-Laurent organization to co-ordinate and promote the ZIP program.

Stratégies Saint-Laurent set up three new ZIP committees: the Alma-Jonquière ZIP Committee, the Est de Montréal ZIP Committee and the Ville-Marie ZIP Committee. As of March 31, 1995, then, nine committees were at work along the St. Lawrence and the Saguenay rivers.

COMMUNITY INTERACTION PROGRAM
Sources of funding of projects

Two regional assessments (for Lake Saint-Louis and Lake Saint-François) were also prepared and disseminated. In March 1994 and February 1995, the Haut-Saint-Laurent ZIP Committee held public consultations on these reports.

LIST OF ORGANIZATIONS HAVING RECEIVED FUNDING FROM THE COMMUNITY INTERACTION PROGRAM

Amis de la Vallée du Saint-Laurent (Les)
Association Bromontoise de conservation Enviro-Faunique
Association de pêche blanche de l'anse aux Foins
Attention Frag'Îles
Centre écologique du Lac Saint-Jean inc.
Club Kiwanis de Saint-Prime
Club Rotary de New Richmond
Comité de développement de New Carlisle
Comité de l'environnement de Chicoutimi
Comité de protection de la santé et de l'environnement de Gaspé inc.
Comité de valorisation de la rivière Beauport
Comité ZIP La Baie
Conseil régional de l'environnement de la Montérégie
Corporation d'amélioration et de protection de l'environnement de Baie-Comeau
Corporation de l'aménagement de la rivière L'Assomption
Corporation du Parc régional de Pointe-aux-Outardes
Corporation de protection de l'environnement de Sept-Îles
Fédération québécoise pour le saumon atlantique
Maison Léon-Provancher (La)
Société d'aménagement de la baie Lavallière
Société d'aménagement et d'exploitation des parcs de Baie-Comeau inc.
Société d'arboriculture du Saguenay
Société de conservation de la baie de L'Isle-Verte inc.
Société Duvetnor Ltée

PRELIMINARY ENVIRONMENTAL RESULTS OF FUNDED PROJECTS	
RESULT INDICATORS	PROJECTED OR TRUE VALUE
Waste collection	**133 tonnes**
Conservation or protection of habitats	**1.6 hectares**
Restored shorelines (stabilized and replanted)	**140 km**
Tree and shrub planting	**56, 000 beds**
Fauna or flora protected	**2 species**
Protection of a vulnerable specie	**1 specie**

PRELIMINARY SOCIO-ECONOMIC RESULTS OF FUNDED PROJECTS	
RESULT INDICATORS	PROJECTED OR TRUE VALUE
Volunteers recruited for the environment	**2, 800 pers./days**
Increased first-hand awareness in the population	**25, 000 individuals (appr.)**
Job creation	**33.2 pers./yrs**
Money invested locally	**820, 000$**

In addition, the two governments established six one-stop service centres. Government employees have been assigned to each of these offices to advise ZIP committees, provide them with technical expertise and support their activities.

Finally, SLV 2000 inaugurated the Community Interaction program in April 1994. In its first year, the program provided technical and financial assistance for 29 community projects.

OUTLOOK

ZIP committees will continue to disseminate summary reports and prepare ERAPs in coming years. A total of twelve reports are scheduled for publication. Each report will serve as basis for an Ecological Remedial Action Plan, which in turn will guide public action.

Local projects stand to benefit even more from the Community Interaction program, as it now has a full year to receive proposals. The objective of the program is to fund and support 140 community projects by 1998.

DECISION SUPPORT

FOR INFORMED DECISION-MAKING

ISSUES

The clean-up of the St. Lawrence and its tributaries represents an enormous undertaking that requires dedication all around. To decide on priorities, and on actions to be taken to preserve such an extensive and diversified ecosystem, it is necessary first to identify the real causes of environmental problems. Public commitment to and involvement in the cause of restoring the St. Lawrence could not be ensured if no effort were made to analyse and disseminate information, raise awareness and provide training. Activities carried out under the Decision Support component are primarily aimed at providing decision-makers, members of the public and other St. Lawrence Vision 2000 (SLV 2000) partners with the scientific information required to make the most enlightened decisions possible.

TARGETED RESULTS

Publish a second report on the state of the St. Lawrence environment

Make four types of scientific and environmental information available to the public

Assess the input of contaminants from the Great Lakes and five tributaries, and their impacts on the ecosystem

Determine the proportion of atmospheric chemical contamination for 18 organic chemicals and 7 metals.

Monitor water quality in the River and 24 of its tributaries

That is why the various programs that are part of this component focus on obtaining information about the state of the St. Lawrence ecosystem and its drainage basin. Their purpose is to incorporate this knowledge into a coherent whole that is accessible to as many people as possible. Besides collecting, interpreting and disseminating relevant data and information, the Decision Support component is making a significant contribution to the design and improvement of sampling, analysis and data-processing techniques.

PARTNERS

The principal partners in this component—the ministère de l'Environnement et de la Faune du Québec, Environment Canada, and Fisheries and Oceans—conduct various research projects and studies on the aquatic and atmospheric environments, each within their respective spheres of expertise. These studies mainly entail taking and analysing samples, and capturing, processing and interpreting the data. They deal with several components of the aquatic environment, such as water, sediments, plant and animal life, and air. The three partners publish information in scientific articles, state of the environment reports, and other documents. Their laboratories have a mandate to conduct analyses in support of the projects, to conduct research on and develop analytical methods and approaches, and to oversee analyses carried out by private laboratories.

ACTIVITIES

The main thrust of the Decision Support component is acquiring, analysing, integrating and disseminating knowledge about the St. Lawrence ecosystem.

This component plays a key role in gathering information. The various partners have, among other things, established a vast network for sampling the waters of the St. Lawrence and 24 of its tributaries. The component is also responsible for publishing a variety of documents on the state of the River and its tributaries, including a comprehensive state of the environment report that will be used as reference by decision-makers and the public.

Beyond this crucial role of compiling and disseminating information, the Decision Support component is partially responsible for developing know-how and analytical support to assist the other components of SLV 2000. It also monitors the performance of accredited laboratories on a regular basis. Government laboratories also engage in research in co-operation with private facilities for various purposes such as improving analytical techniques.

RESULTS

Results include publication of technical state of the environment reports on the St. Lawrence and its tributaries, dissemination of information to the general public, evaluation of the quantity of contaminants discharged into the St. Lawrence and their effects on ecosystems, and monitoring water quality in the St. Lawrence and 24 of its tributaries.

In view of the importance of keeping the public well informed so that it can fully participate, considerable effort has been devoted to disseminating popularized scientific information.

A thematic report on the diverse habitats and plant and animal species of the St. Lawrence was published in the fall of 1993. This layman's document gives an overview of the ecosystems associated with the St. Lawrence.

From 1993 to 1995, five new thematic maps (plates) were prepared as part of the Environmental Atlas of the St. Lawrence. They cover river heritage, fisheries, shoreline, land use, and freshwater and brackish ecosystems. Two «Info-Flash» series were also published in September 1994 and March 1995.

In a further effort to inform the public, an insert on the hydrodynamics of the St. Lawrence, entitled *Le Saint-Laurent, un fleuve en mouvement*, was published in the March 1995 issue of *Québec Science* magazine.

In addition, specialists involved in this component attended many scientific gatherings in Canada and abroad, such as conferences, symposia, lectures and workshops. Noteworthy examples of these include the 21st Aquatic Toxicity Workshop in Sarnia, the 47th Canadian Water Resources Association Conference in Winnipeg, and the 4th *Symposium*

GATEWAY TO THE WORLD

For centuries, the St. Lawrence has been a gateway to the world for Quebec. Today, it is the object of many international exchanges in which SLV 2000 is actively involved.

For example, during the 1994-1995 fiscal year, SLV 2000 hosted 17 delegations from 11 different countries. It is also co-ordinating the Réseau francophone de gestionnaires d'écosystèmes fluviaux et lacustres created by the Agence de coopération culturelle et technique. As well, the Réseau is involved in publishing a newsletter dealing with international developments relating to the integrated management of major rivers.

In addition to taking part in many international scientific gatherings, SLV 2000 staff maintain close ties with institutions such as Océanopolis, a marine museum located in Brest, France. A Canadian delegation presented there an overview of the St. Lawrence Action Plan in late 1993. Such exchanges enable architects of SLV 2000 to learn about other countries' experiences in the field of environmental protection, and to adopt innovative methods that have been tested elsewhere.

on Environmental Toxicology and Risk Assessment in Montreal. These activities are intended to publicize work done under the SLV 2000 plan, and to promote exchanges of scientific and technical information, which are essential to the progress of researchers' work.

One of the expected results of the Decision Support component relates to atmospheric pollutants that are deposited in the St. Lawrence and its tributaries. To acquire information on this type of pollution, a network of stations for sampling organic and inorganic toxic substances was set up. The first three stations—Saint-François, Saint-Anicet and Mingan—came on stream between 1993 and 1995.

This program was the topic of a scientific presentation given at the symposium on toxic substances held in Montreal in May 1994. On that occasion, officials of the Decision Support component awarded research grants to university teams for projects dealing with the measurement and characterization of atmospheric pollutants.

To obtain a comprehensive picture of the changes involving the quality of the St. Lawrence ecosystem and 24 of its tributaries including the major ones, an extensive sampling network is operated, with over 200 year-round sampling sites and nearly 200 seasonal ones.

Over the past two years, data captured by this network has resulted in the publication of four technical reports, each accompanied by a layman's brochure. These reports discuss the water quality of the St. Lawrence, Richelieu and Nicolet rivers, as well as of the Saguenay River and Lake Saint-Jean. According to the findings, the quality of these watercourses has markedly improved as a result of the Programme d'assainissement des eaux du Québec.

Another type of data collected relates to the quality of the aquatic ecosystem, which is measured with reference to fish and benthic communities. Various parameters are analysed, such as the diversity and abundance of species. Furthermore, fish specimens are examined for evidence of external abnormalities and disease. Two reports have been produced, dealing respectively with the benthic and the fish communities of the L'Assomption River basin. They show that diversity indices that have been devised are suitable for detecting pollutant sources, and a worthwhile vehicle for synthesizing and symplifying information.

A report was also published on the characterization of the effluent from the Montreal Urban Community water purification plant. Sampling showed that the treatment system reduces PCB and PAH concentrations by approximately 65 percent.

FROM CATARACTS IN FISH...

The Decision Support component encompasses many research and environmental monitoring activities. They are consistent with a clearly expressed desire to increase our knowledge of the St. Lawrence River drainage basin and to assess the effects of pollutants and the results of measures undertaken to clean up these ecosystems.

One study has pinpointed the cause of cataracts in St. Lawrence fish species. During the summer of 1994, the Institut de médecine vétérinaire de Sainte-Hyacinthe examined the eyes of 4,741 fish belonging to a dozen different species, and determined that the cataracts were caused by parasite larvae. This research led to the publication of a report and an article in the *Bulletin du Centre de la santé de la faune* (Volume 3, Number 1, Winter 1994-1995).

... to dredging of sediments

Above and beyond their planned activities, specialists have begun a project to monitor the effects of dredging on the St. Lawrence ecosystem in the vicinity of Cornwall and Massena, New York. The US-based Alcoa, Reynolds and General Motors plants are set to begin sampling and treating contaminated sediments, particularly those containing PCBs and PAHs, in the St. Lawrence and Grasse rivers. A team is monitoring water quality near the dredging site and has designed a long-range program for monitoring the quality of sediments in this area. A contingency plan has been adopted to handle any technical difficulties that may arise during dredging operations.

Contamination of fish flesh has been studied primarily with the aim of establishing guidelines for human consumption. A new edition of the *Guide de consommation du poisson de pêche sportive en eau douce* was published in the summer of 1993. In addition, various studies on toxic substances have been published, including one describing tests with tracers in the L'Assomption River and a comparison of contaminant levels in the flesh of fish in Lake Saint-François in 1975-76 and 1988.

To help private laboratories that participate in analysing samples to continually improve the quality of their work, a document entitled *Programme d'accréditation des laboratoires d'analyse environnementale, normes et exigences* has been published, along with a preliminary version of a quality control manual based on ISO-CEI 25 and ISO 9000 standards.

Moreover, in co-operation with 3M International, a simplified approach to counting coliform bacteria in drinking water has been developed. The commercial product is a dried culture medium which retains its stability for twelve months. It makes it possible to take total and fecal coliform counts simultaneously.

In addition, some 43,000 analyses were carried out in support of the various SLAP and SLV 2000 programs and projects. A quality assurance program instituted during the St. Lawrence Action Plan (SLAP) and consolidated under SLV 2000 was accredited by the Canadian Association for Environmental Analytical Laboratories in 1993. This program has provided a framework for overseeing and evaluating the quality of analyses done under contract by private laboratories, which has handled approximately 110,000 of them.

A four-part research program was initiated in the Saguenay–St. Lawrence Marine Park sector in 1994. This work will shed light on the local food web, the distribution and behaviour of cetaceans and the effects of commercial whale-watching activities at sea. Two studies have centred on the beluga population of the St. Lawrence. The first one is examining the belugas' distribution and social organization, and seeking to determine whether clans or matriarchal lineages exist which, over the years, have come to frequent particular habitats. This study is supported by a consortium of partners. A second study is looking at the use of Sainte-Marguerite Bay by the St. Lawrence belugas, to determine why the mammals frequent this specific area of the marine park.

Other research projects are being conducted to learn more about the surface currents in the Saguenay Fjord, particularly in areas with sensitive habitats. This information will be used to improve the environmental emergency response plan drawn up earlier by officials of the future marine park.

Finally, a number of measures have been implemented, with promising results, in the estuary and Gulf of St. Lawrence. For example, a recent analysis conducted in co-operation with the Institut national d'écotoxicologie du Saint-Laurent (INESL) demonstrated that DDT and PCB levels in samples taken from male belugas in 1993 and 1994 were significantly lower than in those collected from male specimens between 1982 and 1985. A similar trend was found for the American eel, the harp seal and the seabirds of the estuary and Gulf of St. Lawrence, suggesting that concentrations of these contaminants in the environment have declined. However, it is still too soon to confirm a general downtrend in contaminant levels in beluga tissues. Studies have also been conducted on the fin whale, on small cetaceans such as the harbour porpoise, and on the seals (pinnipeds) that inhabit the estuary. All this research enhances our knowledge of these species, making it possible to more effectively protect them.

In the area of research into the effects of contaminants on the marine environment, biochemical and anatomical biomarkers and physiological markers have been developed, which provide a more precise portrait of the impacts of contaminants on fish health. Preliminary results of a study on the transfer of contaminants from sediments to benthic organisms and groundfish indicate that organochlorine contamination of these organisms is a direct function of the particle-size distribution and

organic matter content of sediment. Benthic worms and crabs can serve as pathways of contamination by transferring organochlorine compounds contained in sediments to organisms higher up the food chain, such as groundfish.

Research on the state of the marine environment has led to two models of water circulation and water levels in the St. Lawrence, in the sector stretching from Montreal to the Cabot Strait. Among its benefits, the first model can be used to produce daily forecasts related to the movement of ice and contaminants.

Under an extensive monitoring program, a time series was produced which showed that, in the estuary and Gulf of St. Lawrence, the period from 1986 to 1994 was characterized by below average temperatures, especially from 1990 to 1994. Finally, as part of the assessment of the quality of the marine environment, eight stations for monitoring ichthyological diversity in coastal habitats along the St. Lawrence estuary have been set up to track the magnitude of changes in environmental conditions. In addition, historical data provided by the ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec and ongoing sampling data have been analyzed.

The PEEP index (Potential Ecotoxic Effects Probe), designed under the St. Lawrence Action Plan for assessing the toxicity of liquid industrial wastes, has been used in connection with the Environmental Choice Program. Bioassay levels established based on this index are now used as standards for applying the EcoLogo symbol to commercial products.

Finally, a project is under way to establish a mass balance of the contaminants in the water and suspended solids in the St. Lawrence based on a complete sampling cycle of one year; the analytical methods were developed during the 1994-1995 fiscal year so that sampling and analysis can go ahead in spring 1995.

OUTLOOK

Under SLAP, stakeholders were given the task of producing a state of the environment report on the St. Lawrence River. The object of this reference work is to promote the active use of environmental information by scientists, educators, consultants, managers and the general public. Although the report was originally slated to come out in 1993, publication has been deferred until the winter of 1996 in order to incorporate the latest data collected under SLAP up to 1993, conduct another round of consultations with SLV 2000 partners and put in place a co-publishing agreement. A compact disk (CD-ROM) version is planned, and some excerpts from the report should also be available on the Internet.

A second state of the environment report is currently being prepared, in accordance with the SLV 2000 schedule. It will include fact sheets on the seven priority issues selected in 1994-1995.

Decision Support stakeholders are also designing management tools, such as an index similar to PEEP but for managing sediments. A risk model using bioanalysis data has also been adapted for use in evaluating the impacts of effluents from the 50 industrial plants targeted under SLAP.

A statistical analysis project is being undertaken to process data on fish caught in the pound trap at the Québec City aquarium over the past 25 years. This analysis will shed light on the changes the different species have undergone during this period which has been marked by significant alterations in the quality of river water. In an initial stage, the data on fish captured in the aquarium trap were computerized, and then in 1994 and 1995 intensive sampling was done to obtain complementary measurements which will be used to fill in gaps in the database.

SEVEN PRIORITY ISSUES (preliminary list)

Contribution of the tributaries and the Great Lakes to the pollution levels of the St. Lawrence.

Change in the River's sediment load.

Bacterial and physicochemical contamination, and aesthetic deterioration of the water caused by various uses.

Disturbance and harassment of wildlife species.

Protection of representative species and habitats.

Degradation of the River environment by toxic effluents discharged by industrial plants.

Risks associated with the consumption of fish, molluscs, crustaceans and waterfowl.

Besides providing analytical support for SLV 2000, the laboratories of the participating departments are carrying out numerous research and development activities. For example, researchers are studying the genotoxicity of the contaminants, designing immunoassays and ecotoxicological bioassays, and developing a permeation probe for petroleum-contaminated soil along with various methods for quantifying organic and inorganic toxic substances which will help to enhance our knowledge of the state of the St. Lawrence ecosystem.

HEALTH

FOR HEALTHY COMMUNITIES — AND A HEALTHY ST. LAWRENCE

ISSUES

The St. Lawrence River has always been central to the lives of the communities along its banks. Although people still fish and sail on the River, and draw their drinking water from it, intensive industrial uses have almost totally eliminated some activities, such as swimming, and severely restricted other uses formerly enjoyed by riverside communities. Substances discharged into the river have had a profound impact on its plant and animal life. People living along the St. Lawrence wonder, and rightly so, whether there are risks to human health as well. Although these issues had already been addressed for the Great Lakes and Arctic regions, no study of this kind had ever been conducted for the St. Lawrence watershed.

The Health component of St. Lawrence Vision 2000 (SLV 2000) is designed to address Quebecers' increasing concern about the impact of contaminants on their health. In an ecosystem approach to managing the St. Lawrence watershed, the health of the ecosystem cannot be considered in isolation from the health of residents.

TARGETED RESULTS

Assess the risks associated with contaminants by developing indicators of exposure, among others

Prepare a report on current knowledge regarding contamination risks to the public

Develop and communicate three strategies for reducing risk

Monitor contamination of human tissues

Publish a report on public health in the 20 ZIPs

The issues raised in this component are not easy to address. The relationship between the presence of contaminants in the environment and their effects on human health is difficult to establish precisely. The health risk posed by a toxic substance depends, first, on the degree to which humans have been exposed to the substance and, second, the health effects of the substance itself. For example, exposure to contaminants may vary with lifestyle and behaviour, place of residence or simply individual vulnerability. Measuring risk levels becomes even more complex when the effects of long-term accumulation of these substances, which are still poorly understood, are factored in.

PARTNERS

Health Canada and the ministère de la Santé et des Services sociaux du Québec are the two lead agencies for the Health component. The Quebec public health network and university researchers are playing a central role.

ACTIVITIES

As there is no precedent for this federal-provincial program to study the relationship between the St. Lawrence and human health, SLV 2000 managers began by establishing a framework for operations, including objectives, implementation mechanisms, financial and human resource management procedures and so on. In addition, strong partnership linkages were established in view

of the decentralized structure of the Quebec public health network, which includes 18 regional boards in addition to the department itself.

A co-ordinating committee made up of representatives from the two departments and the public health network then awarded contracts to public health research teams, to ensure that relevant research got under way quickly. One important benefit of the Health component will be an increase in Quebec expertise related to the effects of water-borne contaminants on human health.

The overall objective of the Health component is to study the relationship between the St. Lawrence and human health, and to implement any measures necessary to protect and promote the health of local communities and users of St. Lawrence resources. Several kinds of activities will be initiated to support this objective. Three uses in particular are slated for special attention: consumption of fish and seafood; consumption of drinking water drawn from the St. Lawrence; and recreation.

Activities under the Health component focus on such topics as populations at risk, exposure to selected contaminants and related health effects, development of risk reduction strategies and monitoring of contamination in human tissues. Stakeholders involved in this component want to take the broadest possible approach, so that action can be geared more effectively to the health of local communities.

A key aspect of the Health component consists in relaying findings to the public. For example, one early topic of study will be the level of public awareness of risks of contamination from river water. Before effective risk reduction strategies can be developed and communicated, it is important to understand what local communities know about the St. Lawrence, as well as associated attitudes and behaviour.

RESULTS

Protection of public health in communities along the St. Lawrence is at the heart of the Health component and, consequently, requires the co-operation of as many people as possible, especially for research projects. To this end, component stakeholders have consistently emphasized consultation and information.

In February 1993, a public consultation was held to establish a basic program framework for the component. Similarly, a conference held in April 1995 brought together key players from the major public health agencies and non-governmental organizations with an interest in public health, to encourage dialogue between representatives from the public health care system and outside agencies.

To provide broader exposure to the complex issues of environmental health, the Health component published an insert, A notre santé, Saint-Laurent, in the magazine *Franc Vert*. A video on health and the St. Lawrence was also produced in French and English. In all, 346 copies of this video were distributed in communities along the St. Lawrence: to 45 community television stations, 90 public libraries, 5 university libraries, 5 CEGEP libraries, 177 CLSCs, 20 public health departments and the Biosphere.

In addition to this communication effort, close to thirty projects were initiated in 1994-1995. The following six projects have been completed:

Health and perception of environmental risks in lower North Shore Montagnais communities near the St. Lawrence. The results of this study have been communicated to the communities surveyed, and were widely disseminated in spring 1995.

Assessment of Beauport Bay beach-goers' exposure to parasite-infested snails that can cause dermatitis.

Evaluation of contamination of edible St. Lawrence algae, with an estimate of present consumption.

Development of a project to raise farmers' awareness of the potential impacts of farming practices on human health.

Survey of awareness and perception of contamination and uses associated with the St. Lawrence. A telephone survey of 18,000 residents in the St. Lawrence watershed was conducted in March 1995. Results will be released in 1996.

Investigation of the perception of risks associated with consumption of drinking water drawn from the St. Lawrence for the Quebec City region. Results are scheduled to be released in autumn 1995.

EXPANDING KNOWLEDGE

In November 1994, SLV 2000 announced a new research fund, established through an innovative partnership with the Fonds de recherche en santé du Québec (FRSQ) and the National Health Research and Development Program (NHRDP). Officially called the Joint FRSQ-NHRDP-St. Lawrence Vision 2000 Research Program in Environmental Health, the fund will promote multidisciplinary research on public health in communities in the St. Lawrence watershed. Each of the three partners will invest one million dollars in this fund over three years.

OUTLOOK

Many of the projects now under way are designed to evaluate contaminant exposure among various segments of the population. The results of these studies will eventually form the basis of specific, realistic recommendations regarding various uses of the River, such as consumption of fish and drinking water, and recreational activities.

Some of these studies concern the consumption of fish caught in the St. Lawrence, particularly by some Montreal ethnic communities and by sport fishermen. To start, the types of species and quantities of fish eaten will be determined, and then the related risks and benefits will be assessed.

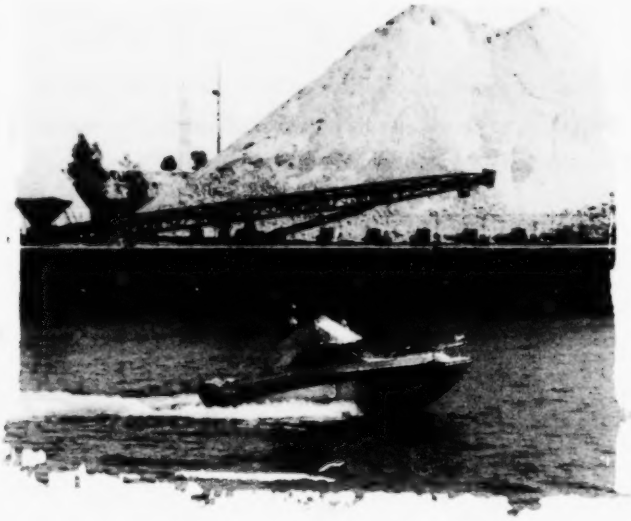
Other studies are examining prenatal exposure to organochlorine compounds in Lower and Middle North Shore communities. Researchers are seeking to evaluate the long-term effects of exposure to these substances, by studying neurobehavioural development of children in this region. As well, biomarkers will be developed to better delineate genotoxicity and the adverse effects of these substances on infant development.

A number of researchers funded under the Health component are studying the impacts of contaminants on the human reproductive system. A pilot study is under way to determine the relationship between organochlorine compounds and endometriosis, a disorder increasingly common among women. Studies conducted in the Great Lakes region have identified a sharp drop in male sperm counts, possibly as a result of environmental contamination. A study of the effects of exposure to organochlorines and heavy metals on the male reproductive function is currently in process.

A descriptive study of cancers possibly linked to environmental causes has been initiated among St. Lawrence River communities. While it is difficult to establish a clear relationship between cancer and the environment, the cancer incidence map to be drafted in this study may give rise to a number of working hypotheses. The study should be completed in 1997.

Furthermore, considerable effort has gone into preparing community health status reports for distribution to St. Lawrence River communities, under the Areas of Prime Concern (ZIP) program of the Community Involvement component. Riverside communities will be able to use the technical data on potential health risks contained in these reports to establish local priorities for environmental intervention. The first reports will be published in the 1995-1996 fiscal year.

PROTECTION



Carole Pinsonneault

THE REDUCTION OF LIQUID TOXIC EFFLUENT

ISSUES

The St. Lawrence and its tributaries are known to receive many inputs of contaminants that seriously degrade the aquatic environment. These contaminants come from a variety of sources, including farming and urban, industrial and other activities. Pollutants from these different sources may be organic, aesthetic or toxic in nature; however, industrial discharges generally consist of toxic substances (heavy metals, organic and inorganic substances).

Toxic substances found in the St. Lawrence and its tributaries have short- and long-term effects on living beings. They may cause the death of living organisms, thus weakening a link in the food chain; they may pose a health hazard for people who drink water or eat fish from the river; and they may jeopardize aquatic and terrestrial ecosystems by destroying and altering habitats.

TARGETED RESULTS

Take action regarding 106 priority plants, 56 of which are new, in order to:

Reduce by 90% the liquid toxic effluent discharged from plants with inadequate waste water treatment

Ensure optimal reduction of liquid toxic effluent discharged from plants in which treatment technologies have already been implemented

Assess toxic effluent discharged from regulated plants and establish corrective measures necessary to optimally reduce their impact on receiving environments

Provide funding and other support for 60 technology development projects designed principally to virtually eliminate toxic substances

The goal of the Protection component of St. Lawrence Vision 2000 (SLV 2000) is to reduce discharges of toxic effluents into the St. Lawrence and its tributaries. Among other things, this component will support and accelerate the Programme d'assainissement des eaux du Québec, which is aimed at cleaning up the province's water resources. A long-term objective of SLV 2000 is to virtually eliminate discharges of eleven persistent bioaccumulative toxic substances of industrial origin.

PARTNERS

The ministère de l'Environnement et de la Faune du Québec (MEF) and Environment Canada are working in close co-operation to achieve the objectives of the Protection component. The two governments are committed to the concept of integrated action directed at

THE ELEVEN SUBSTANCES

The eleven persistent and bioaccumulative substances targeted by SLV 2000 are those identified in August 1993 by the International Joint Commission, namely:

- PCBs
- DDT
- dieldrin
- toxaphene
- dioxins
- mirex
- mercury
- alkylated lead
- benzo(a)pyrene
- hexachlorobenzene
- furans

industrial plants. In addition, many private firms are participating in this effort through contracts to develop and demonstrate new technologies.

The MEF, through its regional offices, is responsible for integrated action (water, air, soil) targeted at industrial firms, in keeping with the "single window" principle. It is also responsible for developing environmental guidelines to improve the quality of the aquatic environment, preparing and updating the list of accredited SLV 2000 laboratories, giving technical advice, drafting specifications, manuals and other technical support documents, and training regional project managers.

Environment Canada is responsible for the quality assurance and control program for analytical methods, ecotoxicological assessment of effluents, computer support, awarding of characterization contracts, and the preparation of reports, fact sheets and other documents.

Environment Canada and the MEF also serve as a driving force for the development and demonstration of pollution control techniques and more environmentally friendly production techniques.

ACTIVITIES

The main objective of the Protection component is to eliminate industrial pollution. Stakeholders of this component have identified 106 industrial establishments as priorities in this regard, and also promote demonstration projects using new environmental technologies.

Reducing discharges of industrial effluent

Fifty establishments located on the banks of the St. Lawrence and Saguenay rivers were targeted for action under the St. Lawrence Action Plan (SLAP). As part of SLV 2000, an additional 56 industrial establishments were added to the list, thereby extending the sphere of action to sixteen tributaries of the St. Lawrence.

GREATER REGIONALIZATION TO IMPROVE SERVICE

During the St. Lawrence Action Plan, the St. Lawrence Action Team set out to characterize effluents and identify treatment options on a plant-by-plant basis. In contrast, SLV 2000 has assigned all these activities to specialists in the regional offices of the ministère de l'Environnement et de la Faune du Québec (MEF). This approach points up the SLV 2000 goal of bringing management of its activities closer to the public and the role of the MEF regional offices as one-stop information centres where companies can find solutions to their pollution problems, whatever their nature.

While the original 50 priority plants were ordered to carry out extensive clean-up projects, many of those included under SLV 2000 are now equipped with effluent treatment systems. Quebec's industrial landscape has changed dramatically in the last ten years. In view of this, the 106 targeted industrial establishments have been divided into four distinct groups, each with its own specific objectives.

The first group includes eleven industrial plants that discharge wastewater without adequate treatment. The objective for these establishments is a 90 percent reduction in toxic effluents.

The second group is made up of 22 plants that employ fairly recent treatment technologies with good results. SLV 2000 will monitor the toxic effluent from these establishments, to ensure that treatment techniques yield optimal pollution control.

The third group comprises 23 pulp and paper plants. These establishments are subject to federal and provincial regulations and were ordered to reduce their effluents in order to comply with new standards by the end of 1995. SLV 2000 assesses toxic effluents from these plants against

established environmental objectives and identifies corrective measures for reducing impacts on the receiving environment.

The fourth group consists of the 50 industrial plants selected under the St. Lawrence Action Plan. The primary role of SLV 2000 consists in monitoring ongoing work and ensuring that the techniques used yield the expected results.

Technology development

Two objectives of the SLV 2000 partners are seeking to promote new environmental technologies and the expansion of the environmental protection industry in Quebec. Through its scientific expertise and programs of financial assistance, SLV 2000 encourages firms to adopt new technologies and acts as a partner in R&D work on new industrial processes and clean-up and restoration technologies.

RESULTS

The St. Lawrence Action Plan had an objective to reduce by 90 percent the toxic effluent discharges of 50 targeted industrial plants, and achieved an estimated reduction of 74 percent by 1993, and 80 percent by 1994. This slightly behind schedule performance can be explained in part by the date at which the new federal and Quebec regulations governing pulp and paper plants become effective. These regulations set the end of 1995 as the deadline for compliance, thus slowing progress toward the target of 90 percent.

Protection component staff have prepared an inventory of the 106 targeted industrial establishments, complete with photographs, which serves as a highly useful database for managers.

A number of major clean-up projects were conducted in 1993-1995 at industrial plants identified under SLAP. Thirty-eight paper mills (15 SLAP establishments and 23 SLV 2000 plants) conducted extensive work to bring their operations into line with the new regulations.

Protection component stakeholders also published a number of information documents, including a detailed characterization guide for consultants and laboratories.

In addition, they implemented a program to prequalify sampling firms, conducted three studies to develop CHIMIOTOX and PEEP models and updated the related data.

Environment Canada has invested close to $15 million under the Technology Development and Demonstration Program since the inauguration of the St. Lawrence Action Plan, including $4 million in the last two years under SLV 2000. Private and public sector partners invested $50 million in the same period. Some 23 technology development and demonstration projects were conducted in co-operation with the private sector. Examples of the results of these initiatives include highly versatile dredging equipment with reduced sediment loss; an expert positioning system incorporating remote sensing and map generation technology; a process to biofilter volatile hydrocarbons during bioventilation of gasoline-contaminated soil; and an *in situ* soil treatment method that combines air injection with hydrocarbon fume suction.

Other projects under this program include a series of three guides designed to help proponents and managers implement projects to dredge and restore contaminated sediments, and a guide for storing oily debris and residues recovered from the riverbanks after marine spills.

In addition, the MEF provided a total of $7 million in funding for 59 projects during 1993-1995. These projects, which centred on treatment of industrial wastewater, remediation of contaminated soils and management of hazardous wastes, were designed to reduce discharges of toxic substances into the St. Lawrence. To date, 23 of the

INDUSTRIAL ESTABLISHMENTS TARGETED IN THE PROTECTION COMPONENT OF ST. LAWRENCE VISION 2000

1. INDUSTRIAL ESTABLISHMENTS THAT DISCHARGE THEIR WASTE-WATER WITHOUT ADEQUATE TREATMENT

BICC Philipps Inc., Rivière-Malbaie

La Compagnie minière Québec Cartier, Port-Cartier

Cuirs Sal-Tan Inc., Louiseville

ICI Explosifs Inc., Brownsburg

ICI Explosifs Inc., McMasterville

Mines Wabush, Sept-Îles

Norton Céramiques avancées du Canada inc., Shawinigan

Les Technologies industrielles SNC inc., Le Gardeur

Raffineries de Napierville Inc., Napierville

Société d'électrolyse et de chimie Alcan ltée., usine de Shawinigan, Shawinigan

Stella-Jones Inc., Delson

2. INDUSTRIAL ESTABLISHMENTS THAT HAVE ALREADY IMPLEMENTED TREATMENT TECHNOLOGY AND THAT MAY DISCHARGE TOXICS

Aluminerie Alouette inc., Sept-Îles

Aluminerie Lauralco Inc., Deschambault

Chemprox chimie Inc., Bécancour

Duchesne & Fils ltée, YamachicheLes Emballages Knowlton inc., Lac-Brome

Eka Nobel Canada Inc., Salaberry-de-Valleyfield

General Motors du Canada Ltée., Boisbriand

Goodfellow Inc., Saint-André-Est

Hyundai Auto Canada inc., Bromont

IBM Canada Ltée, Bromont

Infasco division de la société en commandite Ifastgroupe, Marieville

Manufacturier Granford inc. (Le), Saint-Alphonse

Montupet Ltée, Rivière-Beaudette

Norsk Hydro Canada Inc., Bécancour

Nova PB Inc., Sainte-Catherine

Société d'électrolyse et de chimie Alcan ltée., usine Laterrière, Laterrière

SNW Québec, Marieville

SKW Canada inc., Bécancour

Société Canadienne De Métaux Reynolds, division usine de tiges Reynolds, Bécancour

Stelco-McMaster Ltée, Contrecoeur

Produits chimiques Sterling, Buckingham

Albright & Wilson Amérique Ltée., Buckingham

3. REGULATED ESTABLISHMENTS

Avenor inc., usine de Gatineau, Gatineau

Cartons Saint-Laurent inc., usine de Matane, Matane

Cartons Saint-Laurent inc., usine de La Tuque, La Tuque

Cascades Inc., division Joliette, Joliette

Cascades Inc., division Papier, Kingsey Falls

Cascades East Angus inc., East Angus

Pâte Et Mohawk Ltée., Saint-Antonin

Corporation Stone-Consolidated, division Belgo, Shawinigan

Corporation Stone-Consolidated, division Laurentides, Grand-Mère

Désencrage Cascades, division de Rolland inc., Sainte-Hélène-de-Breakeyville

Désencrage C.M.D. Inc., Cap-de-la-Madeleine

Papiers de communication Domtar, Windsor

Emballages Stone (Canada) Inc., division Pontiac, Litchfield

BPCO, division d'Emco ltée, Pont-Rouge

Industries James Maclaren inc., division Papier Journal, Buckingham

Industries James Maclaren inc., division pâte kraft, Thurso

La compagnie J. Ford Ltée, Notre-Dame-de-Portneuf

Kruger inc., Bromptonville

Malette Québec inc., Saint-Léonard-de-Portneuf

Matériaux Cascades Inc., Louiseville

Papiers Scott ltée, Lennoxville

Produits Forestiers E.B. Eddy ltée, Hull

Tembec Inc., Témiscamingue

4. ESTABLISHMENTS TARGETED UNDER THE ST. LAWRENCE ACTION PLAN

Abitibi-Price Inc. papeterie Beaupré, Beaupré

Abitibi-Price Inc., unité d'affaires d'Alma, Alma

Abitibi-Price Inc., unité d'affaires de Kénogami, Jonquière

Aciers Inoxydables Atlas, division De Sammi-Atlas Inc., Tracy

Albright & Wilson Amérique Ltée, Varennes

Aluminerie de Bécancour Inc., Bécancour

Cascades Jonquière inc., Jonquière

Coastal Pétrochimie du Canada , Montréal-Est

Corporation QUNO, Baie-Comeau

Corporation Stone-Consolidated, division Port-Alfred, La Baie

Daishowa Inc., Québec

Division de papiers fins de spécialité, Beauharnois

Dominion Textile Inc. (Usine de finition Beauharnois), Saint-Timothée

Elkem Métal Canada Inc., Beauharnois

F.F. Soucy Inc, Rivière-du-Loup

Héroux inc., Longueuil

ICI Canada inc. produits forestiers, Bécancour

Kronos Canada Inc., Varennes

Kruger inc., Trois-Rivières, division du papier journal et du papier couché, Trois-Rivières

Les Alcools de Commerce ltée, Varennes

Les Industries de Préservation du Bois Ltée, Tracy

Les Papiers Perkins ltée, Candiac

Les Services T.M.G. inc., mine Niobec, Saint-Honoré

Locweld Inc., Candiac

Métallurgie Noranda inc., Affinerie. CCR, Montréal-Est

Monsanto Canada Inc., La Salle

Pétro-Canada, Montréal

Pétromont inc., Varennes

Pétromont société en commandite, Montréal-Est

PPG Canada Inc., Beauharnois

Pratt & Whitney inc., usines 1,2 et 5, Longueuil

Produits chimiques Expro Inc., Saint-Timothée

Produits forestiers Alliances inc., Donnacona

Produits Forestiers Donohue Inc., Clermont

Produits Nacan Ltée, Boucherville

Produits Nacan ltée, Varennes

Produits Shell Canada Ltée, Montréal-Est

QIT-Fer et Titane inc., Tracy

Sidbec-Dosco (Ispat) Inc., Contrecoeur

Société canadienne de métaux Reynolds ltée, Baie-Comeau

Société d'Aluminium Reynolds du Canada, Cap-de-la-Madeleine

Société d'électrolyse et de chimie Alcan ltée, Jonquière, Jonquière

Société d'électrolyse et de chimie Alcan ltée, usine de Beauharnois, Melocheville

Société d'électrolyse et de chimie Alcan ltée, usine Grande-Baie, La Baie

Société d'électrolyse et de chimie Alcan ltée, usine Isle-Maligne, Alma

Stone-Consolidated inc., division Wayagamack, Trois-Rivières

Tioxide Canada Inc., Tracy

Tripap inc., Trois-Rivières

Ultramar Canada Inc., Saint-Romuald

Zinc Électrolytique du Canada ltée, Salaberry-de-Valleyfield

PUBLICATIONS TO RAISE AWARENESS OF ENVIRONMENTAL TECHNOLOGIES

SLV 2000 has produced a brochure on the Technology Development and Demonstration Program, together with project profiles and a series of technical fact sheets. These documents are intended for private firms, organizations and individuals interested in new environmental technologies, and describe the status of technologies that can be used for pollution prevention applications, in a context of sustainable development.

«Industrial Wastewater» series

Selection and introduction of closed-circuit technologies in a thermomechanical pulp and newsprint mill.
Technological adaptation of a dissolved air flotation unit for clarifying of effluents from de-inking plants.
Recovery of heavy metals from industrial effluent using Thermonic technology.
ZenogemTM membrane bioreactor for the treatment of oily waste.
Treatment of de-inking effluents by activated sludge and aerated lagoon systems: pilot study and scale-up.

«Contaminated Soils» series

A method to assess soil biotreatability and to monitor bioprocess effectiveness.

«Hazardous Waste» series

Inventory of recovery and recycling technologies for the mercury in discarded lamps and spent batteries.

DecontaksolvTM process for the decontamination of PCB capacitors.

«New Tools» series

The Positag 2 system: an integrated GIS/GPS sensor/software combination.

50 plants targeted under SLAP and 9 of the 56 SLV 2000 plants have participated in the MEF's technology development program.

OUTLOOK

In 1993-1995, the Protection component initiated several projects that should bear fruit in the coming months and years. For example, SLV 2000 partners have begun to characterize the effluents of 11 plants that release insufficiently treated wastewater and 22 establishments that have implemented treatment technologies which, albeit effective, may not eliminate all toxic substances.

In addition, environmental discharge objectives were established for 13 additional plants under SLV 2000, and a program is being developed to recognize firms with environmentally friendly operations.

RESTORATION

BREATHING NEW LIFE INTO THE ST. LAWRENCE!

ISSUES

Stakeholders of the Restoration component estimate that 4,000 hectares of St. Lawrence wetland have been destroyed in the last 40 years owing to erosion, dredging and filling, agricultural runoff, use of the riverbanks for services and recreation, and residential, industrial and commercial development. The loss of these wetlands, which serve as rich reservoirs of life, represents a real threat to biodiversity and, by extension, the environment as a whole.

The central objective of the Restoration component of St. Lawrence Vision 2000 (SLV 2000) is to restore a number of severely deteriorated sites. This work will not be restricted to marshlands along the St. Lawrence, but instead will encompass zones that have been heavily impacted by human activity, for example, the Lachine Canal and the major ports of Montreal, Trois-Rivières and Québec City.

TARGETED RESULTS

Decontaminate the Lachine Canal

Set up six pilot projects for habitat restoration

Produce four development and restoration plans:

Three national wildlife areas:
- **Cap Tourmente**
- **Iles de l'estuaire**
- **Saint-François Lake**

The islands under federal jurisdiction between Montreal and Sorel

The Restoration component therefore is dedicated to devising realistic solutions for improving the health of the St. Lawrence River in the short and medium term. The focus will be on testing and promoting rehabilitation techniques, while ensuring that current uses do not hinder the overarching project to clean up the St. Lawrence.

PARTNERS

The Restoration component includes several partners, who are participating under the direction of Environment Canada and Canadian Heritage.

ACTIVITIES

Pilot habitat restoration programs have figured among the most important activities of the Restoration component in the last two years. This activity complements efforts by the Biodiversity component to protect the natural environment. The ultimate objective of the pilot projects is not to restore a given number of hectares or kilometres of riverbanks, but to inventory potential measures and priorities for restoring natural habitats, with the primary goal of re-creating suitable wildlife habitat. Simple, low-cost methods for restoring degraded sites will suffice in most cases.

Some restoration projects, particularly the clean-up of the Lachine Canal and national ports, are relatively complex, however, and require advanced technology. The stakeholders of the Restoration component will provide appropriate technical assistance.

Finally, in the interest of protecting the environment of the Mingan Archipelago National Park Reserve, Restoration component stakeholders are doing work to make this site more functional.

RESULTS

Pilot restoration projects

Stabilization of the banks of the St. Lawrence is a major activity of the Restoration component. Component staff have determined the most appropriate stabilization techniques for the affected sectors, and have experimented with alternatives to rockfill, which is costly.

The vegetation cover of eleven small islands near Brossard was restored, to increase the islands' carrying and support capacity for nesting waterfowl. Three of these islets were ploughed and seeded; however, owing to the high cost of moving equipment, nesting sites were simply laid out on the eight others. In all, Restoration staff set up 130 nesting areas each covering 5 m^2. They also made 70 small nesting sites using simple clusters of branches suitable for waterfowl species. Finally, they developed three terneries for common tern, to promote the expansion of this aquatic bird population.

To counteract the loss of wetlands along the St. Lawrence, the Restoration team restored a marsh near the Jean-Lesage Freeway in Rivière-du-Loup. In co-operation with the ministère des Transports du Québec, they used concrete blocks to build three settling basins that should help to stop erosion and return the marshland to its natural state.

Stakeholders of this component also began rehabilitating a peat bog on L'Isle-Verte near Rivière-du-Loup, to make it more attractive to species like Black Duck. Four ponds have been created. Three of them have an alkaline filter containing limestone, and the fourth acts as a control, for measuring results. Thanks to these alkaline filters, the water in the experimental ponds has been brought back to a pH of 6.5.

On L'Isle-Verte, the team is also seeking to restore a marshy area drained by farmers, using an ingenious system of dikes and tide gates that allow the area to drain without being flooded by river water. In addition, an economical pumping and canal intake system was installed in co-operation with Ducks Unlimited Canada.

Finally, in 1993-1995 stakeholders of the Restoration component inventoried and mapped the banks of the St. Lawrence between Cornwall and the Île d'Orléans, to provide adequate data for agencies wishing to implement various measures.

Lachine Canal

Another SLV 2000 objective is to clean up the Lachine Canal, and various options have been examined so far. The results indicate that encapsulating sediments along the banks of the Canal is technically feasible. This approach offers greater environmental benefits and better pollution control in the study area, at a cost below most other options.

The environmental assessment report of the Lachine Canal clean-up project was tabled with the (federal-provincial) Joint Environmental Assessment Panel on November 22, 1993. The Panel decided that it required further information, and in April 1994 issued a statement of deficiences for the environmental assessment. To remedy the situation, Parks Canada and the Société du Vieux-Port de Montréal submitted supplementary information for the environmental assessment on March 2, 1995.

National ports

In 1993-1994 fiscal year, SLV 2000 produced two summary reports on the status of SLAP projects in the ports of Montreal and Quebec City. The purpose of these popularized, abundantly illustrated documents is to inform the public and media about problems that arise in such projects and the efforts undertaken since 1988 by the government partners of SLV 2000.

The Québec City port area received the most attention during this period. The main objective was to determine the environmental benefits of doing remedial work in the Saint-Charles River estuary, the most contaminated port sector. Two studies were conducted to provide additional information on currents, suspended solids and bulk inputs to the Saint-Charles estuary. While the results indicate that the situation of bottom sediments is not urgent and does not require immediate action, some medium- and long-term measures must be envisaged. Controlling persistent sources of inputs should be the first step.

Considerable efforts were directed at the eastern sector of the Montreal Port in 1994-1995, in light of clear evidence that contaminants were being released into the River there. Some temporary measures were implemented to eliminate, or at least reduce, the dispersion of hydrocarbons which occasionally rise from bottom sediments. While these measures did not solve the problem definitively, they did lead to a significant decrease in emergency response action during the year.

Furthermore, SLV 2000, the Société du Port de Montréal and companies located on Wharf 103 concluded a financial co-operation agreement to jointly study the extent of the bottom sediment problem in this part of the harbour. This characterization study served as the basis for a second phase, consisting in examining intervention options. The partners renewed this agreement in February 1995.

OUTLOOK

In coming years, stakeholders of this component will continue to experiment with wetland restoration. In addition, community action guides will be produced for most wetland projects, indicating potential sites, rehabilitation options, and project costs. Local and regional organizations will be able to use these documents to design and conduct appropriate restoration projects.

Several projects will be monitored closely, for example, the nesting sites on the islets in the St. Lawrence near Brossard and the marshland near the Jean-Lesage Freeway in Rivière-du-Loup. Others, such as riverbank stabilization in the Îles-de-la-Paix National Wildlife Area near Montreal, will be continued. While a preliminary study in 1994 recommended the use of rockfill, the feasibility of less costly methods such as fences, fascines and cribwork will be examined during 1995-1996 fiscal year.

Other projects have been initiated, such as one to restore marshland in the vicinity of the port of Cacouna, which was filled in the 1970s when the national ports system was undergoing expansion. In 1993-1995, the Restoration component team prepared a development plan which should be implemented over the next two years. This plan covers 60 to 70 hectares of marshland, about half of which was filled during construction of the port.

A MULTIPURPOSE MARINA

The first phase in a project to establish a multipurpose marina east of the Havre-Saint-Pierre wharf was completed in June 1995. This 32,250-m^2 marina can accommodate about 70 boats with a 3 m draft at low tide.

The marina has boosted environmental protection capability in the Havre-Saint-Pierre region in general and in the Mingan Archipelago National Park Reserve in particular. For example, there is almost no possibility now a vessel anchored at sea will become unfastened from its boom and run aground on one of the Park Reserve islands or on the north shore. In addition, recreational boaters now have a safe place for discharging their wastewater and used oil. The marina is equipped with two modern fuel pumps, which offer the advantage of limiting or even eliminating spills during vessel refueling. Accidents of this type used to be a common occurrence when five gallon jugs were still in use.

Finally, Parks Canada patrol boats can now dock at this facility during a greater part of the navigation season, and can assist vessels in distress or act more quickly to control hydrocarbon spills. In addition, since these vessels are constantly in the water, Parks Canada staff can perform everyday tasks (e.g., resource studies, resource monitoring and protection, public safety and law enforcement) more effectively.

Finally, in the same period, the Restoration component stakeholders conducted a characterization of sand pits in the Québec City region, to identify those with strong potential as waterfowl habitat. Sand pits that have been excavated right down to the water table hold the most promise as aquatic environments suitable for waterfowl. In coming years, component stakeholders plan to test various techniques for developing abandoned sand pits.

In April 1995, the Joint Environmental Assessment Panel for the Lachine Canal clean-up project announced that the environmental impact study contained the information needed to hold public hearings, and relayed this decision to the ministère de l'Environnement et de la Faune du Québec. The next step consists in holding public hearings in keeping with Quebec environmental assessment procedures.

The clean-up of the Lachine Canal is one aspect of an overall development plan for this site. The Lachine Canal guiding plan is currently being revised and will be tabled for public and government agency review in 1996.

In addition, a process has been initiated to determine appropriate action for the Québec City and Trois-Rivières port areas. This work will get under way in the next year and will focus on persistent sources of contamination. Finally, the Restoration component stakeholders are continuing their efforts to encourage partners to restore the eastern part of the port of Montreal, which is the most contaminated sector.

EFFECTIVE MANAGEMENT

HARMONIZING ACTIVITIES

Some ten federal and Quebec government departments are actively involved in the new goals pursued by St. Lawrence Vision 2000 (SLV 2000). These agencies all share a concern for protection and conservation of the St. Lawrence ecosystem, but operate under different, and not always compatible, mandates, structures and authority. Achieving simple, flexible and effective management is therefore a major challenge, as the many activities of SLV 2000 must complement one another within a well co-ordinated framework.

A joint management structure has been established to enable participating agencies to take part in decision making and manage the overall plan. For example, an Agreement Management Committee composed of representatives from the federal and Quebec governments meets regularly to set policy, consult community organizations and monitor implementation of each component of the agreement.

Seven harmonization committees, with representatives from each participating department, have been established as well. These committees meet regularly to plan, implement and follow up on activities conducted under individual components.

MEASURABLE OBJECTIVES AND RESULTS

Like the St. Lawrence Action Plan (SLAP), SLV 2000 has set measurable objectives and results for each of the seven components, to ensure regular accountability to the public for accomplished progress.

TOOLS FOR EFFECTIVE MANAGEMENT

Projects of this magnitude call for administrative procedures capable of effectively monitoring all activities. They also produce a great deal of information that must be managed and processed to support decision-making by the appropriate authorities. Therefore, a number of management tools to facilitate information exchange and effective communication between partners have been developed.

AN INFORMED PUBLIC

Participating federal and provincial departments are committed to keeping the public informed about the progress and accomplishments of SLV 2000. In addition, useful scientific findings must be disseminated to the general public, media and decision-makers. To meet these commitments, participating departments have therefore established mechanisms to co-ordinate and harmonize their communications activities.

HIGHLIGHTS OF THE PERIOD FROM APRIL 1993 TO MARCH 1995

- Negotiations between participating federal and provincial departments to agree on new objectives and results relative to protecting, conserving, restoring and enhancing the St. Lawrence and its tributaries.
- Signature (in April 1994) of SLV 2000, the second Canada-Quebec agreement to conserve and protect the St. Lawrence ecosystem.

- Establishment of the Agreement Management Committee (AMC), as well as harmonization committees for each SLV 2000 component.
- Establishment of a SLV 2000 co-ordination office, to provide support and secretarial services to all partners, manage and process information, and keep participating departments abreast of activities.
- Establishment of a committee to harmonize communications.
- Design and implementation of a management information system (MIS) to track the progress of SLV 2000 programs and provide all partners with access to a unified management system.
- Organization of a series of meetings and consultations by the AMC with community stakeholders, to better understand their interests and constraints.
- Organization of meetings between SLV 2000 and Great Lakes 2000 managers, to harmonize and co-ordinate activities related to the overall St. Lawrence–Great Lakes ecosystem.
- Organization, by Environment Canada, of three meetings to exchange information on the ecosystem approach used in action plans such as SLV 2000. These meetings produced a report, *Guiding Principles for Ecosystem Initiatives*, that describes the principles underlying Canadian environmental action plans.
- Development of a mandate and an organizational structure for the advisory committee, as well as a search for candidates for the position of chairperson and for general members.
- Production and dissemination of *La Source*, the internal SLV 2000 newsletter.

COMMUNICATIONS

1993-1995 Highlights

Several institutional communications activities related to the components of the St. Lawrence Action Plan (SLAP) and St. Lawrence Vision 2000 (SLV 2000) were conducted between April 1, 1993 and March 31, 1995. The purpose of these activities was to report to the public, media, non-governmental organizations and SLV 2000 partners on the progress achieved in implementing the plan and stimulate interest in it. Particular attention was devoted to making public recent findings on the state of the environment of the St. Lawrence and its tributaries. The most important communications activities were as follows:

Institutional activities

- Production and diffusion in April 1993 of the 1988-1993 Final Report of the St. Lawrence Action Plan.
- Production and diffusion of two issues of the newsletter *Le Fleuve*.
- Production and diffusion of the media bulletin *SLV 2000 Express*.
- Production and diffusion of the first biennial report of St. Lawrence Vision 2000.

Biodiversity component

- Diffusion of the 1992-1993 report of the Interdepartmental Action Plan to Ensure the Survival of the St. Lawrence Beluga.
- Continuation of the public awareness campaign to protect the Piping Plover in the Magdalen Islands.
- Dissemination in 1994-1995 of the recovery plan for the Horned Grebe.
- Organization of annual habitat conservation workshops.
- Production and diffusion of a poster, A *Whale of a Future*, on efforts to preserve the beluga population.

Community Involvement component

- Publication of regional assessments of the Lake Saint-Louis study area in March 1994 and the Lake Saint-François area in February 1995.

Decision Support component

- Diffusion of five new plates of the Environmental Atlas of the St. Lawrence covering river heritage, fisheries, the shoreline, land use and freshwater and brackish ecosystems.
- Diffusion of two thematic reports, one on the diverse habitats in the St. Lawrence and another on water quality from the standpoint of direct human consumption.
- Diffusion of two "Info-Flash" series on the St. Lawrence River (September 1994 and March 1995).
- Publication in the March 1995 issue of *Québec Science* magazine of an insert on the hydrodynamics of the St. Lawrence, entitled *Le Saint-Laurent, un fleuve en mouvement*.
- Diffusion of a study identifying the causes of cataracts in St. Lawrence fish, specifically tomcod. It generated both a report and an article in the *Bulletin du Centre de la santé et de la faune* (volume 3, number 1, winter 1994-1995).

- Diffusion of six technical reports, each accompanied by a layman's brochure, describing water quality in the St. Lawrence, Richelieu, Nicolet, L'Assomption, Yamaska, Chaudière and Saint-François rivers.
- Diffusion of a report on fish and benthic organisms in the L'Assomption River, as well as a second edition of the *Guide de consommation du poisson de pêche sportive en eau douce* (summer 1995).
- Production and diffusion of a fact sheet on the Fisheries and Oceans research program within the framework of SLV 2000.
- Production and diffusion of a fact sheet entitled *The aerial Census of St. Lawrence Belugas.*
- Publication of the newsletter *Beluga*, volume 5, no 1.
- Production of the video Mission: Marine mammals / Mission: mammifères marins.
- Production and presentation of a promotional booth for SLV 2000.

Health component

- Publication of an insert, A notre santé, Saint-Laurent, in the February-March 1995 issue of *Franc Vert* magazine.
- Distribution of a video on health and the St. Lawrence.

Protection component

- Diffusion of nine fact sheets in the "St. Lawrence Technologies" series, presenting the results of technology development projects.
- Diffusion of a brochure and a leaflet describing the Technology Development and Demonstration Program and available financial assistance programs.
- Diffusion of an infomercial in the magazine *Vecteur environnemental.*
- Information session on priority plants in the Montreal region.
- Information session on priority plants in the Montérégie region.
- Information session on priority plants in the Québec City region.
- Information session on priority plants in the Saguenay–Lake Saint-Jean region.
- Information session on priority plants in the Mauricie–Bois Francs region.

Restoration component

- Diffusion of a report on sediment contamination in the Québec City harbour.
- Diffusion of a report on sediment contamination in the Montreal harbour.
- Site visit to the L'Isle-Verte peat bog development project.
- Site visit to the spartina marsh restoration project at the L'Isle-Verte National Wildlife Area.
- Site visit to the long grass prairie development project on the islets in the St. Lawrence Seaway.
- Site visit to the riverbank stabilization project in the Contrecoeur islands.

EXPENSES PERTAINING TO SLV 2000 ACTIVITIES FOR 1993/1994 AND 1994/1995

(IN THOUSANDS OF DOLLARS)

	FEDERAL GOVERNMENT										QUEBEC GOVERNMENT				TOTAL
	Environment Canada		Fisheries and Oceans		Health Canada		Agriculture and Agri-Food Canada*		Canadian Heritage		Ministère de l'Environnement et de la Faune du Québec		Ministère de la Santé et des Services sociaux du Québec		
COMPONENTS	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	
Biodiversity	949.7	2,479.2	380.6	983							614.9	1,567.4			6,974.8
Agriculture							650.1	875.5			1	212.2			1,738.8
Community Involvement	290.8	656.3		125								82			1,154.1
Decision Support	3,944.7	4,961	422.4	1,352							3,150	4,200			18,030.1
Health					256	1,713.9							160	531.7	2,661.6
Protection	3,189.4	3,478.8									10,894.6	13,658.7			31,221.5
Restoration	856.8	667.8							364.5	479.5					2,368.6
Communication and administration	220.4	480.7									40	205			946.1
TOTAL	**9,451.8**	**12,723.8**	**803**	**2,460**	**256**	**1,713.9**	**650.1**	**875.5**	**364.5**	**479.5**	**14,700.5**	**19,925.3**	**160**	**531.7**	**65,095.6**

* Green Plan's Funds

EXPENSES PERTAINING TO SLV 2000 ACTIVITIES FOR 1993/1994 AND 1994/1995

(IN THOUSANDS OF DOLLARS)

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COMPONENTS	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	93/94	94/95	
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* Green Plan's Funds

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